REMARKS

I. INTRODUCTION

Claim 7 has been canceled herein without prejudice. Therefore, claims 6 and 8-12 are pending, with claim 6 having been amended herein. It is believed that the amendments to claim 6 do not raise new issues that would require further consideration and/or search, and also do not raise the issue of new matter. It is also believed and respectfully submitted that this Amendment places the application in better form for appeal by materially reducing or simplifying the issues for appeal. Entry of the foregoing amendment to the claims is therefore requested.

Before addressing the rejections, Applicants wish to clarify certain issues noted by the Examiner. Firstly, the Examiner is correct in stating that on page 2 of the previous response the reference number "34" or "34'" should have been used instead of "52" to refer to the point connected to ground. In addition, the Examiner is also correct that the term "Nernst reference electrode" used on page 3 of the previous response referred to the Nernst electrode (identified as 16 in Figure 1). Applicants wish to thank the Examiner for helping to correct and clarify these identifications.

II. THE REJECTION OF CLAIMS 6-12 UNDER 35 U.S.C. § 112, FIRST PARAGRAPH, FOR LACK OF ENABLEMENT

Claims 6-12 were finally rejected under 35 U.S.C. § 112, first paragraph, for lack of enablement.

In the Final Office Action, the Examiner has restated that the specification is not enabling with respect to the recited terms "negative feedback", "optimized", and "maximized". As will be discussed further below, Applicants submit that the term "negative feedback" is enabled by the specification. With respect to the term "optimized", without necessarily acquiescing in the position taken by the Examiner, the claims have been amended to delete this term. With respect

to the term "maximized", the only claim that includes this term, claim 7, has been canceled herein, without prejudice.

In the "Response to Arguments" section of the Final Office Action, the Examiner questions how, even assuming that an increase in R3 affects the voltage eventually applied to the negative terminal of the amplifier (shown in Figure 4), this increase constitutes an increase in negative feedback.

As an initial matter, Applicants agree that the term "negative feedback" in general describes a process whereby an increase in the output of a device (such as an amplifier) is fed back into an input of the device so as to counteract the increase in the output. In this manner, negative feedback can promote steady-state operation, or at least prevent overswings of the output.

With respect to the claimed probe, Applicants refer to Figure 4 which shows the output of an operational amplifier supplying a pump voltage and current to the pump cell (specifically, to electrode 40) of the probe, and also shows the reference electrode (18) coupled to the negative (-) terminal of the amplifier. Figure 4 also depicts the connection (through resistors not shown) of the Nernst electrode (16) and the inner pump electrode (38). Through this connection, the pump cell is effectively coupled to the Nernst cell, and the voltage level supplied to the pump cell directly affects the voltage levels in the Nernst cell. This coupling, without further measures, can lead to positive feedback phenomenon such as overswings and ripples.

The "negative feedback" according to the present invention functions as follows (as would be understood by those of skill in the art). An increase in the voltage and current output from the amplifier is applied to the pump cell and results in an increase in pump current I_p. As discussed in the previous responsive amendment, the voltage level at the Nernst electrode can be expressed as:

$$V_{Nernst} = I_{const} \cdot R2 + R3 \cdot (I_p + I_{const}) ;$$

from which equation it can be seen that the greater the level of R3, the greater the effect that a unit increase in the pump

current will have in increasing the voltage at the Nernst electrode. In other words, by increasing R3, one is "amplifying" the potential feedback resulting from an increase in the output of the amplifier.

Since, as is well known, the difference in voltage between the voltage level at the Nernst electrode and the reference electrode is proportional to the difference in oxygen concentration to which each of the electrodes are exposed, an increase in the voltage level at the Nernst electrode caused by an increase in R3 will result in the same increase in the voltage level at the reference electrode, all else being equal.

As the reference electrode is coupled to the negative terminal of the amplifier, the loop is completed: the increase in the output from the amplifier is boosted by the magnitude of the resistance R3 and converted to an increase in the voltage at the Nernst electrode; this increase in the voltage at the Nernst electrode directly translates into a similar increase in the voltage at the reference electrode, which, being input to the negative terminal of the amplifier, decreases the difference between the positive and negative terminals of the amplifier, reducing its output.

It is believed that the negative feedback sequence outlined above would be discernable to those of skilled in the art without undue experimentation from the description within the specification. It is therefore respectfully submitted that the term "negative feedback" is enabled by the specification.

As regards the term "optimized", claim 6 previously recited the limitation "wherein the negative feedback is optimized by adjusting magnitudes of the resistors." This limitation has been removed, and the new limitation, "wherein magnitudes of the plurality of resistors are chosen so as to reduce a rippling effect at a stoichiometric point" has been added to the claim. Support for this new limitation can be found, e.g., on page 3, lines 4-7 of the specification. Applicants note that the concerns raised by the Examiner in paragraphs 10 and 12 of the Final Office Action do not apply to

the new limitation, and it is submitted that this new limitation is clearly enabled by the specification.

In light of the foregoing, it is respectfully submitted that claims 6 and 8-12 are enabling. Withdrawal of the rejection of these claims under 35 U.S.C. § 112, first paragraph, is therefore requested.

III. THE REJECTION OF CLAIMS 6-12 UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claims 6-12 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. In particular, the Examiner has reasserted that the terms "optimized" (recited in claim 6) and "maximized" (recited in claim 7) render these claims indefinite.

Since claim 6 has been amended to remove the term "optimized", and since claim 7 has been canceled, it is respectfully submitted that the claims no longer include the terms objected to, and that the indefiniteness rejection has been obviated. Withdrawal of the indefiniteness rejection is therefore requested.

IV. CONCLUSION

In light of the foregoing, Applicants respectfully submit that pending claims 6 and 8-12 are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

KENYON & KENYON

Dated November 3, 2003

By: _____
Richard L. Mayer
Reg. No. 22,490

(by Reg. No. 36,197)

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